

## IAF SPACE ASTRONOMY TECHNICAL COMMITTEE (SATC)

### 1. Introduction

The combination of ground and Space Astronomy systems has created a time of remarkable discovery and growth. Even though the field of astrophysics is vast, the IAF Space Astronomy Technical Committee (SATC) concentrates its work in the area of space astronomy and in particular, serves as a forum for the exchange of information and interaction between the scientific community, space industry, and space agencies involved in the preparation and the future development of new astronomy missions. Therefore, the SATC action covers the very early phases of mission concepts before these are proposed to the Agencies for assessment. As such, the SATC role is largely complementary and comes ahead of the possible future Agency programmes, allowing SATC to enable or improve the emergence of new science mission concepts.

### 2. Summary

The key development in 2022 is the finalization in January of the deployment of the NASA James Webb Space Telescope, based at the second Lagrange point (L2). The initial images from the telescope, even during the commissioning phase, have demonstrated that the system is exceeding all expectations for its performance and it is now ready to provide key insights to the formation and processes of the early Universe.

Also in orbit at L2, the ESA GAIA mission continues to observe the positions of stars in the Galaxy, leading to the release of a third catalogue in June this year, this adds many new parameters and the number of recorded objects is now more than 1.8 billion. Apart from local stars in our Milky Way, Gaia has also observed many other things such as Solar system objects, as well as extra-galactic objects including Quasars, binary star systems, and of course other distant galaxies.

### 3. Highlights

High-energy astrophysics missions have all achieved significant milestones with Chandra, XMM-Newton and the Integral observatory all exceeding 20 years in mission lifetime and all still contributing significant new results in the X-ray and Gamma-ray astronomy domains.

Together with the JWST, the Hubble Space Telescope also continues to provide high-quality science including both telescopes observing the impact result on the Dimorphos asteroid from the DART mission.

Meanwhile, on earth, the Paris IAC this year has been a great success with all the astronomy technical sessions presenting high-quality papers and all very well attended – even at times exceeding the room capacity!

### 4. Future Outlook

Given the very high interest in Moon exploration, as a precursor for venturing to other planets, the SATC also wants to explore the technologies that will be needed for effectively enabling experimental research in astrophysics from the Moon, with a special focus on radio-astronomy, astro-particle physics and gravitational wave detection. This means not only the technologies directly related to specific scientific instrumentation but also the technologies required for deployment, operation and maintenance of detectors and arrays of detectors in the dusty lunar environment and cryogenic temperatures at depth in polar craters. It will also be needed to identify and catalogue the sites whose characteristics make them invaluable for science and the conditions that must be met for their preservation and avoidance of interference, in relation to other non-scientific activities that might be carried out concomitantly on the Moon or by spacecraft in orbit around it.

Another key topic is the continuing need to capitalize on and use the synergies between archives of space data. Astrophysics is exemplary in having open data policies, and with new mandates that may come in the United States, open literature and open archives are getting support, and reports are needed to consider the impacts of those policies on Space Astronomy.

## 5. Committee activities

The main SATC activity for the current year are focused on:

1. Long-term analysis of the technical, scientific and programmatic areas of space astronomy. Serve as a forum for the exchange of information and interaction between the scientific community, space industry and agencies involved in the preparation and future development of new

astronomy missions. Particular emphasis is on technological breakthroughs for future space applications (e.g. space cryogenics systems, cube-sat constellations, space-ground synergy).

2. Organizing the A7 session for the IAC 2023 to provide a wide range of topics on future space plans by Agencies as well as highlighting current and future technologies relevant to the Space Astronomy community in dedicated sessions at the IAC.
3. Planning for the A7 symposium at IAC 2024 for the discussion and publication of ideas and relevant results and issues to the impact and needs of future astronomical missions.
4. In addition to the IAF/IAC meetings, the committee will also organise several intermediate virtual meetings for members during the year.